

## Variable Camshaft Timing (VCT) Unit

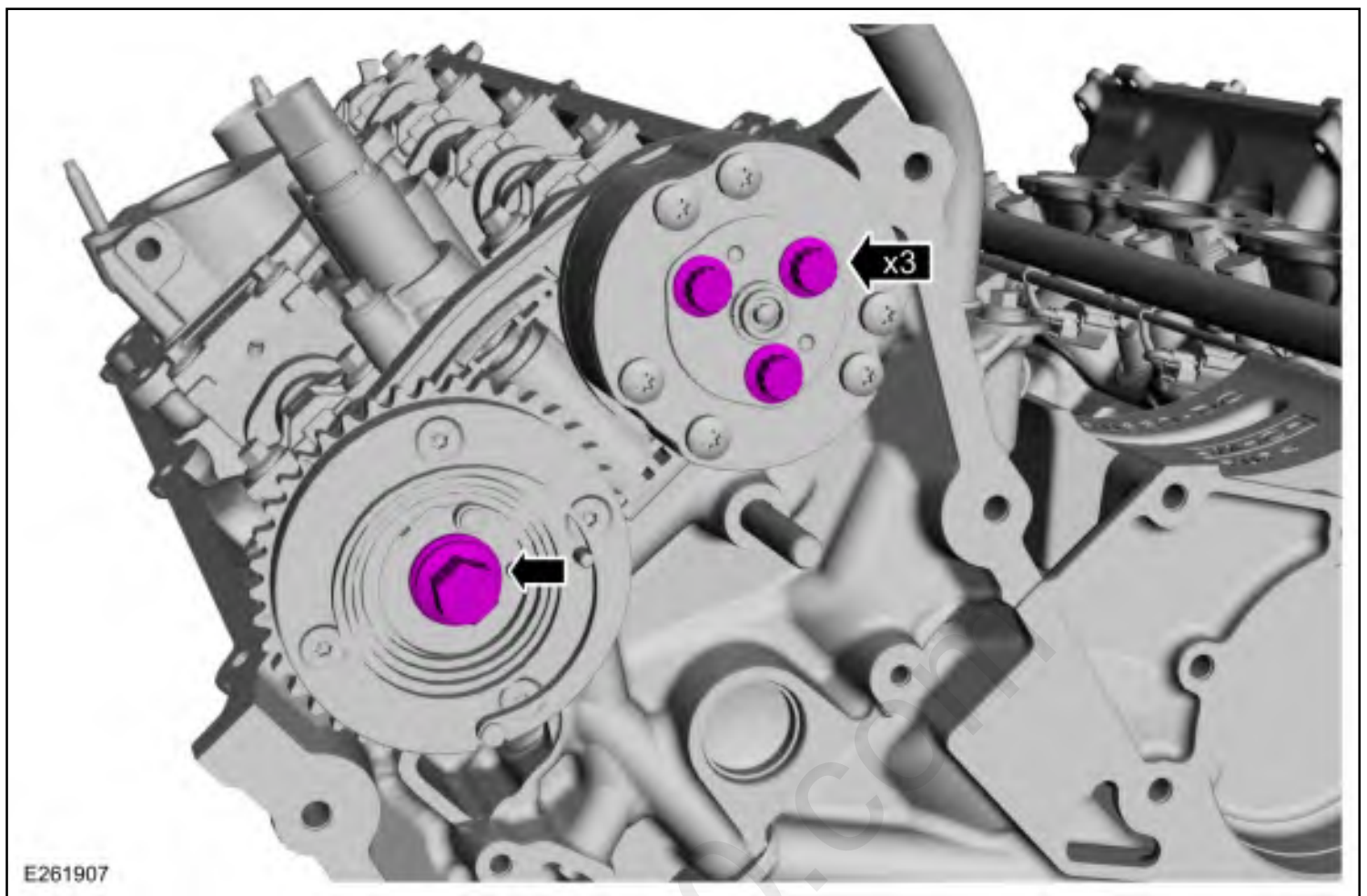
### Removal

**NOTICE:** During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

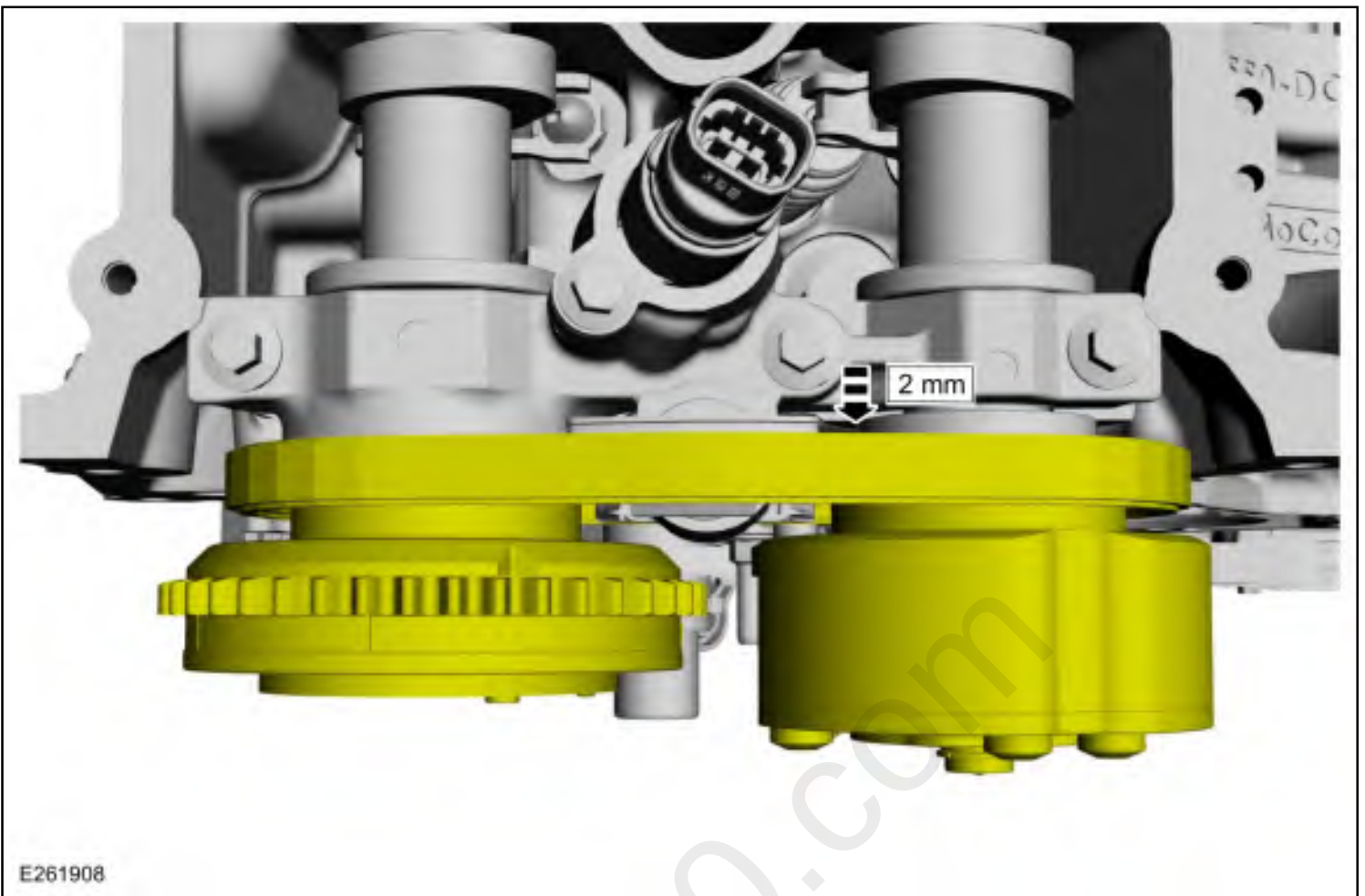
**NOTE:** If the RH VCT units are being serviced at the same time as the LH VCT units, remove the RH VCT units first.

### Right hand units

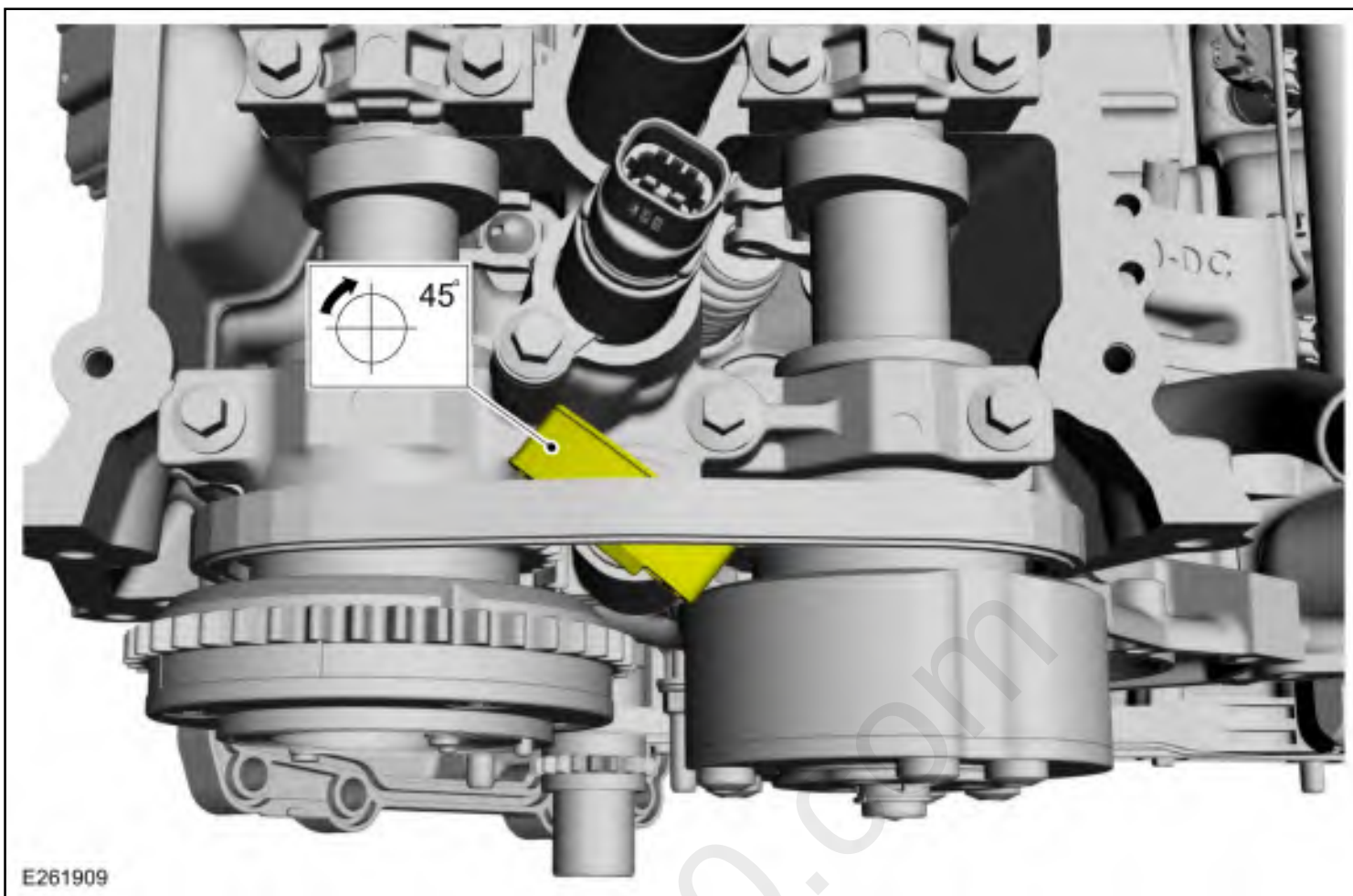
1. Remove the RH timing chain.  
Refer to: Timing Chain (303-01 Engine - 5.0L 32V Ti-VCT) .
2. Remove the intake and exhaust VCT assembly bolts.



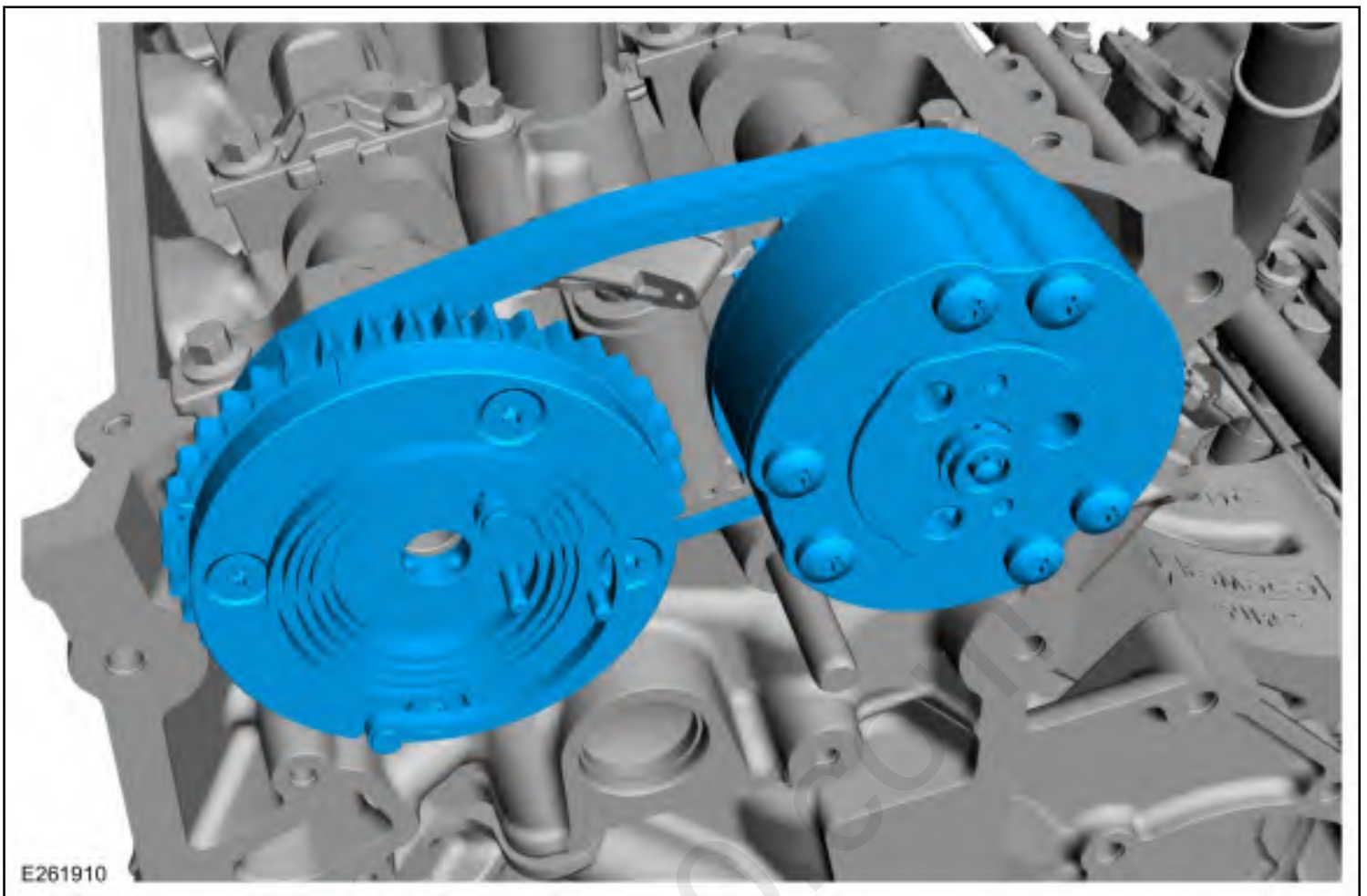
3. Slide the VCT assemblies and secondary timing chain forward 2 mm (0.078 in).



4. Depress and turn the secondary tensioner clockwise 45 degrees.



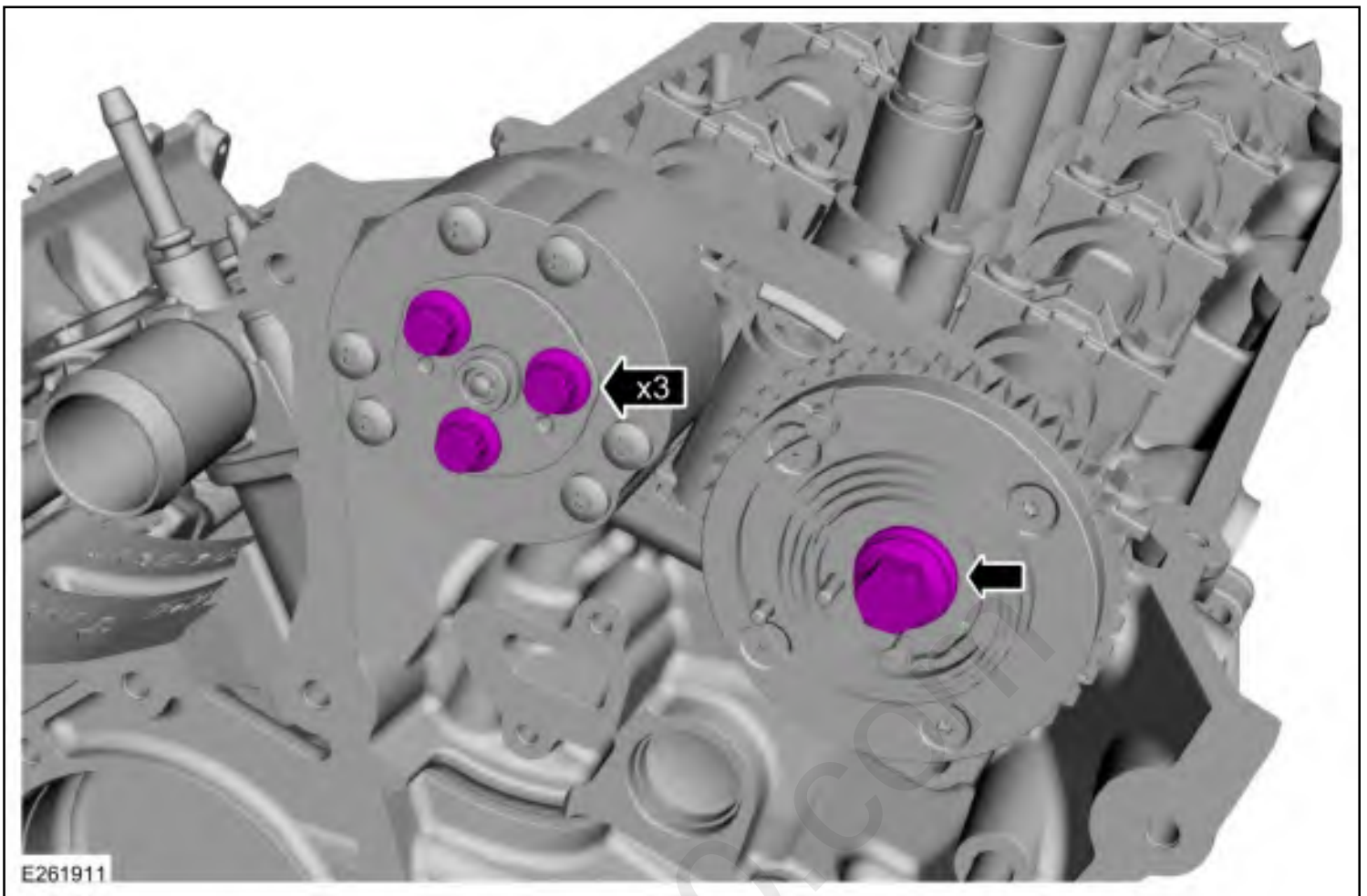
5. Remove the VCT assemblies and the secondary timing chain.



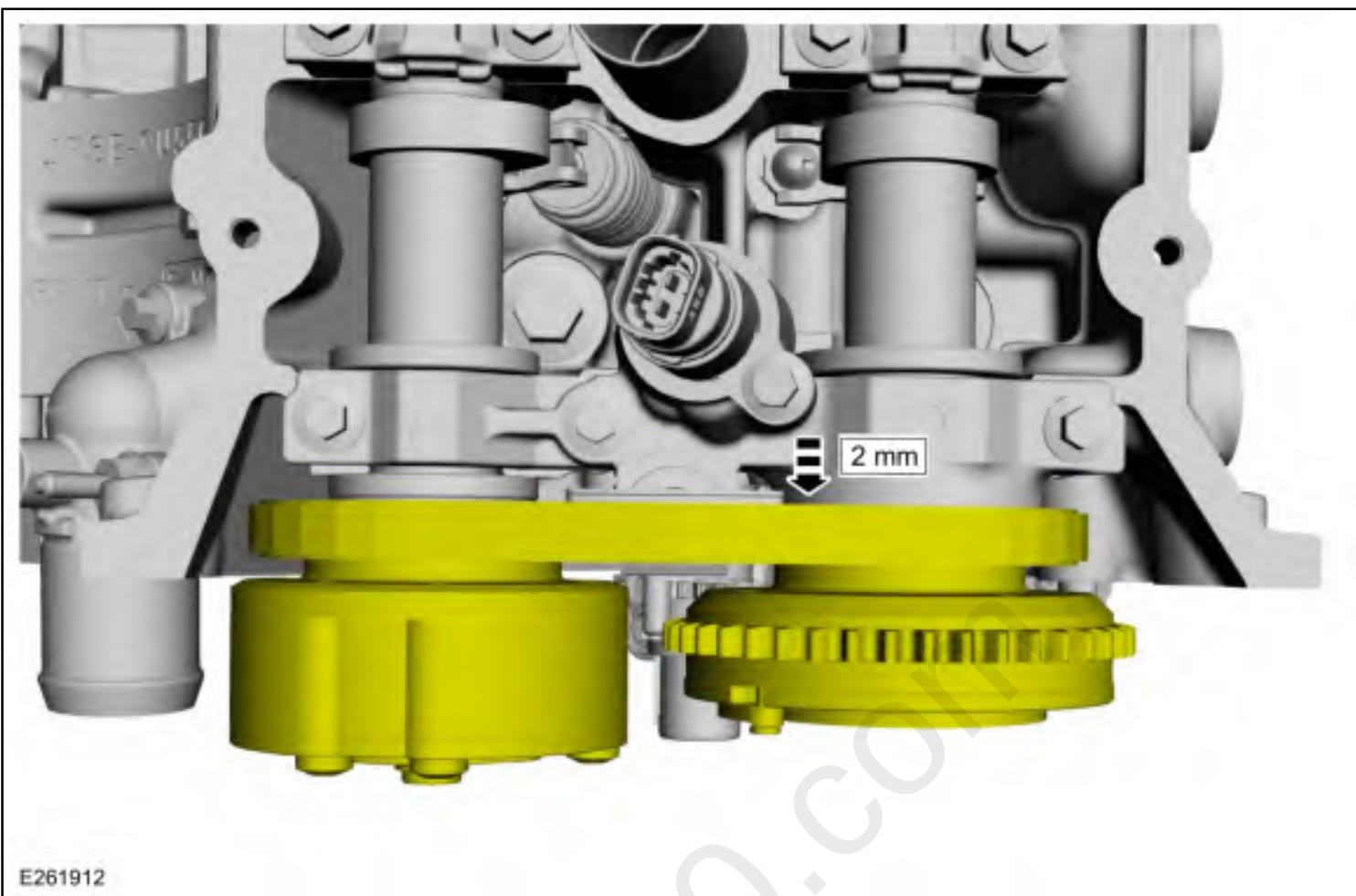
### Left hand units

6. Remove the LH timing chain.  
Refer to: Timing Chain (303-01 Engine - 5.0L 32V Ti-VCT) .
7. Remove the intake and exhaust VCT assembly bolts.

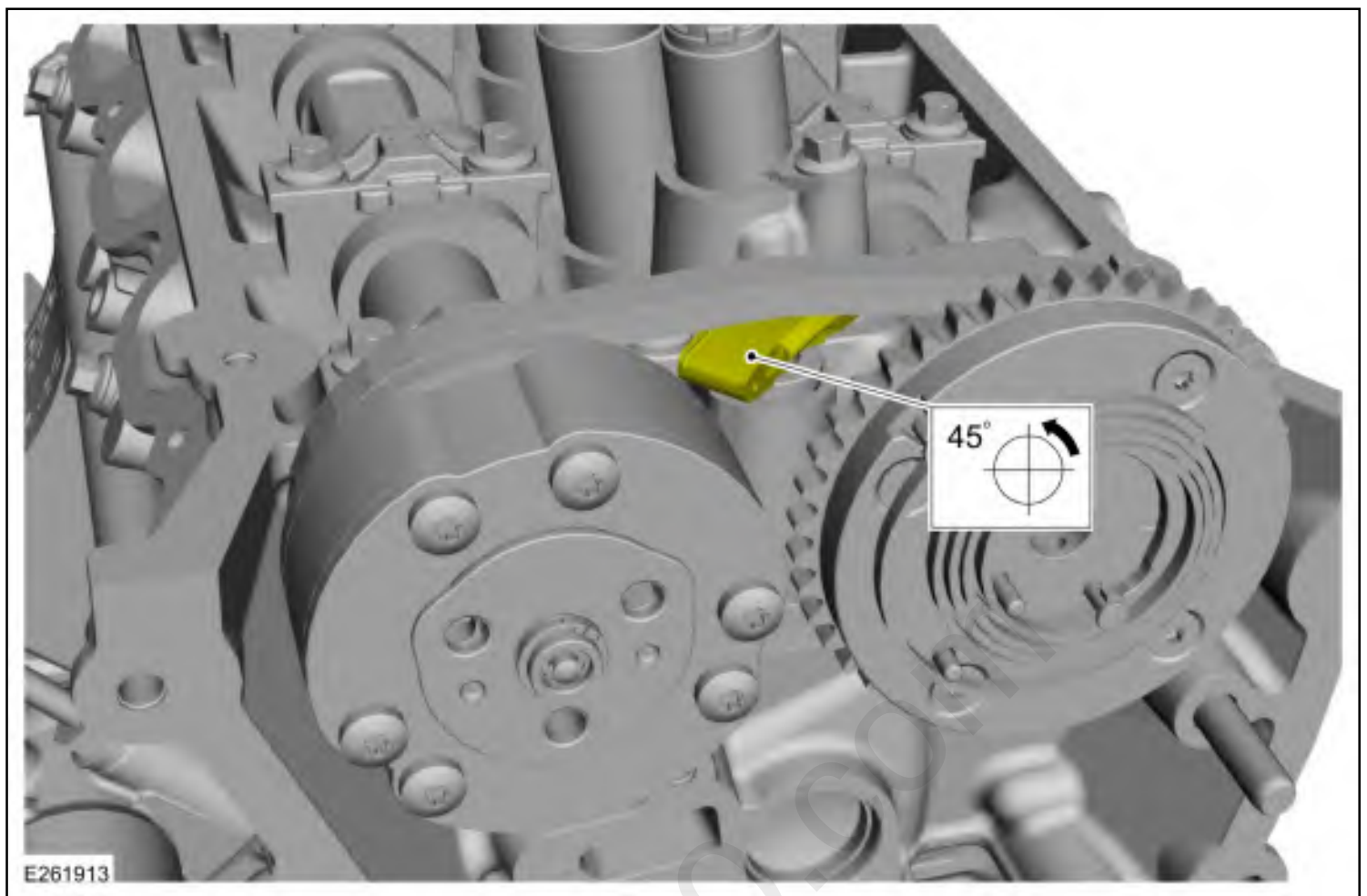




8. Slide the Variable Camshaft Timing VCT assemblies and secondary timing chain forward 2 mm (0.078 in).

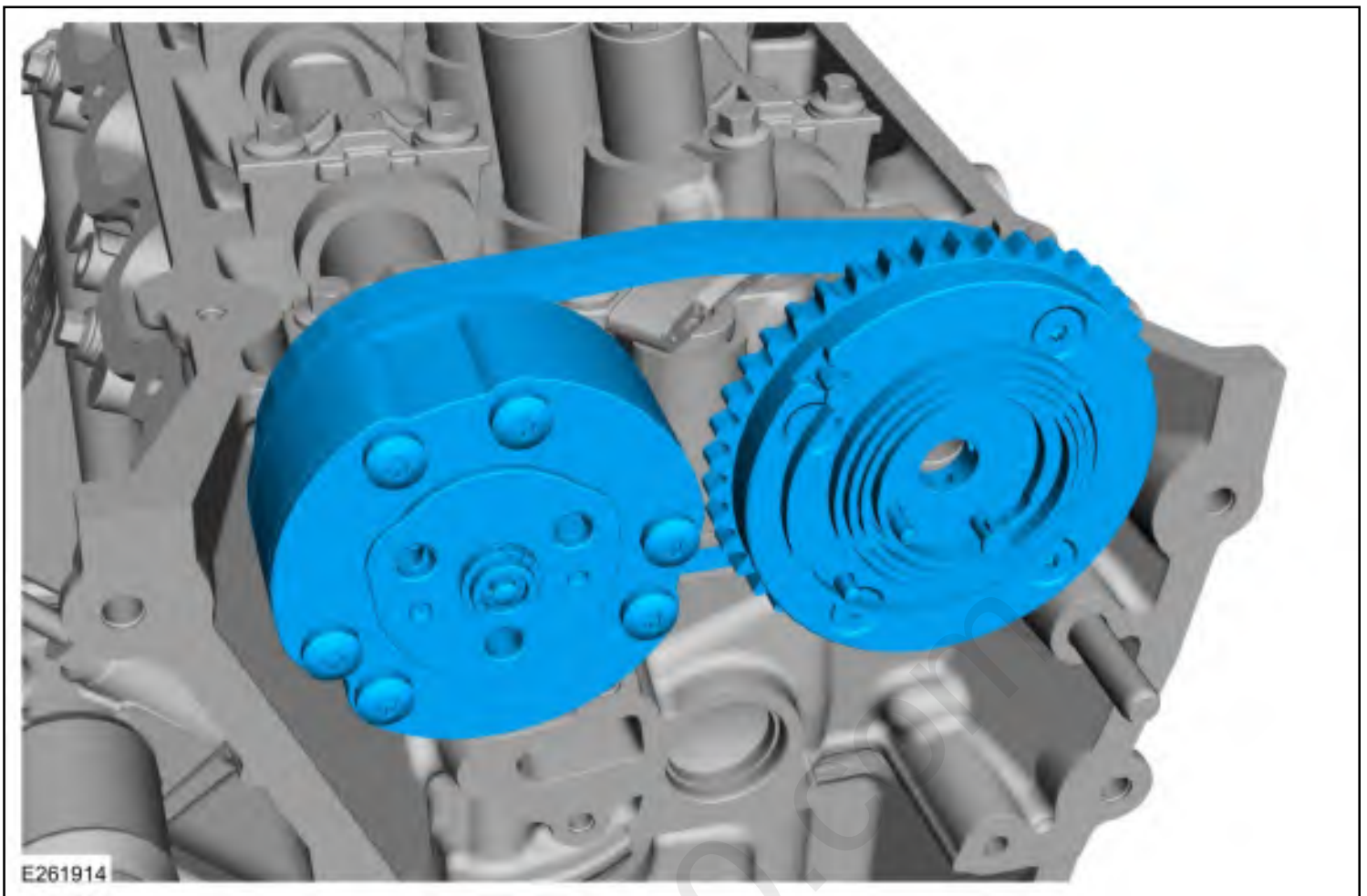


9. Depress and turn the secondary tensioner counterclockwise 45 degrees.



10. Remove the VCT assemblies and the secondary timing chain.

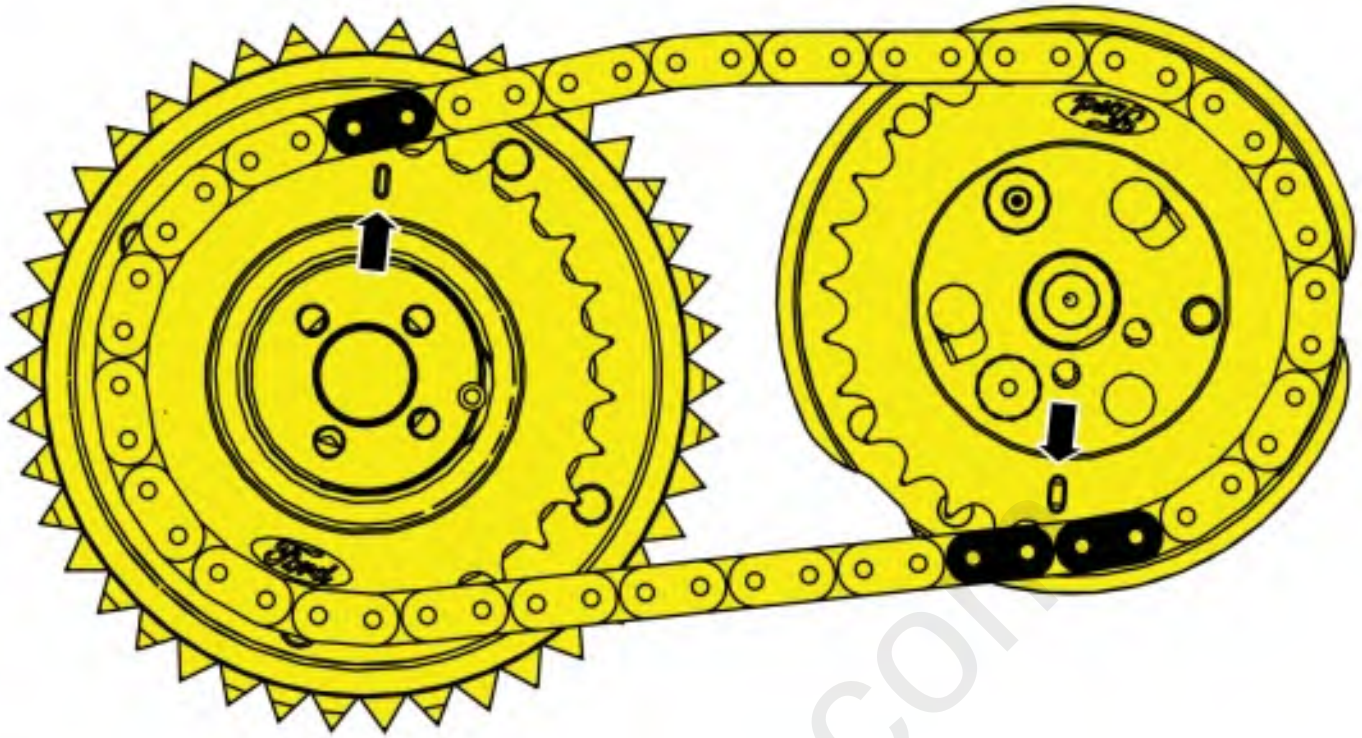




## Installation

### Left hand units

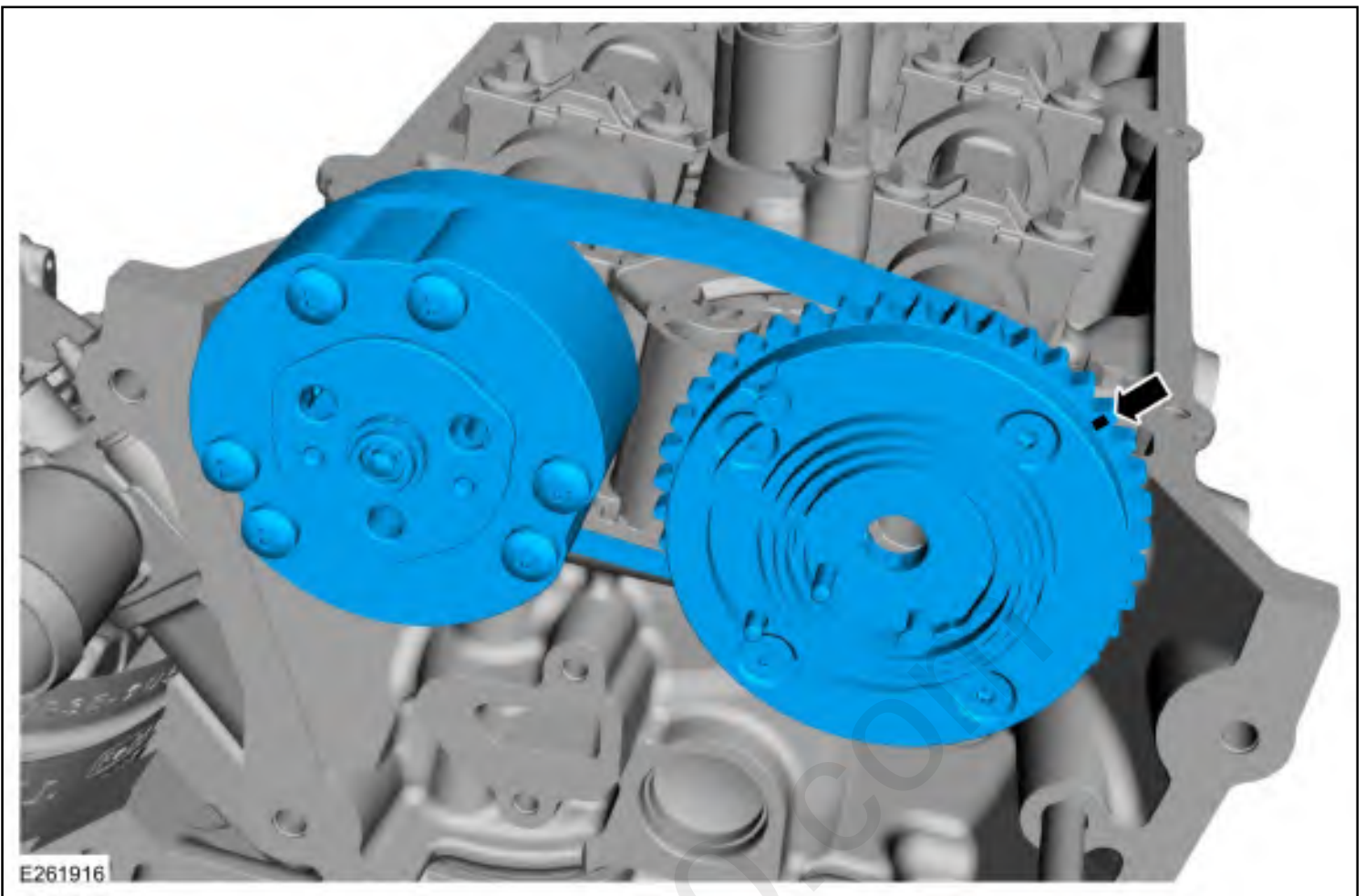
1. Position the secondary timing chain onto the VCT assemblies. Align the colored links on the secondary timing chain with the timing marks on the VCT assemblies as shown in the illustration.
  - The timing mark on the intake VCT assembly should align between the 2 consecutive colored links.
  - The timing mark on the exhaust VCT assembly should align with the single colored link.



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2. Install the VCT assemblies and the secondary timing chain onto the camshafts. The timing mark on the exhaust VCT assembly should be approximately in the 1 o'clock position.

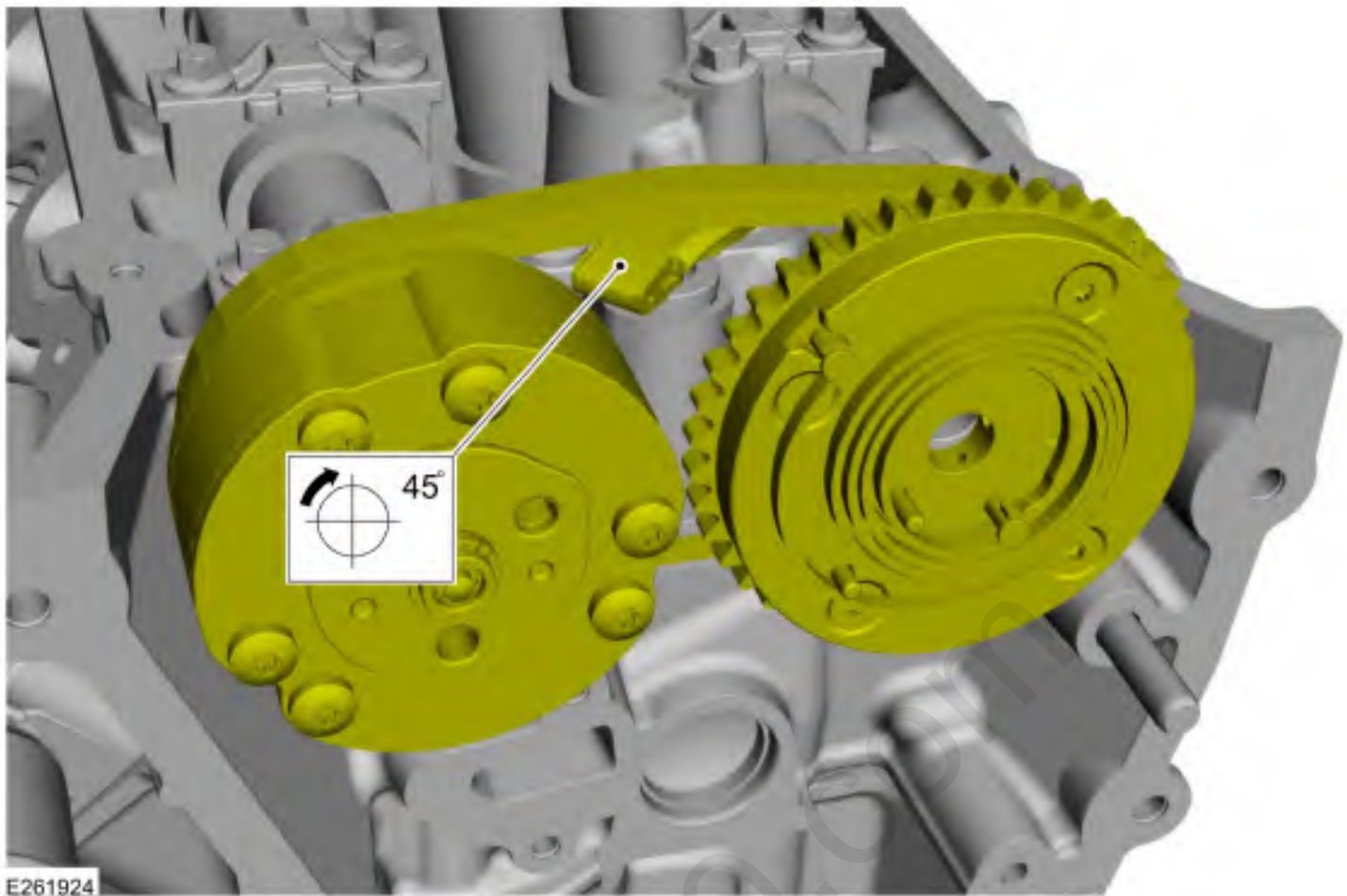


3. **NOTE:** *It may be necessary to rotate the exhaust camshaft slightly (using a wrench on the flats of the camshaft) to seat the VCT assemblies onto the camshafts.*

Rotate the secondary timing chain tensioner clockwise 45 degrees so the ramped area is facing forward and fully seat the VCT assemblies onto the camshafts.

- If the secondary timing chain is not centered over the tensioner, reposition the VCT assemblies until they are fully seated on the camshafts.





4. **NOTE:** Use a wrench on the flats of the camshaft to hold the camshafts while tightening the VCT assembly bolts.

1. Install the intake VCT assembly bolts.

*Torque:*

Stage 1: 133 lb.in (15 Nm)

Stage 2: 90°

2. Install the exhaust VCT assembly bolt.

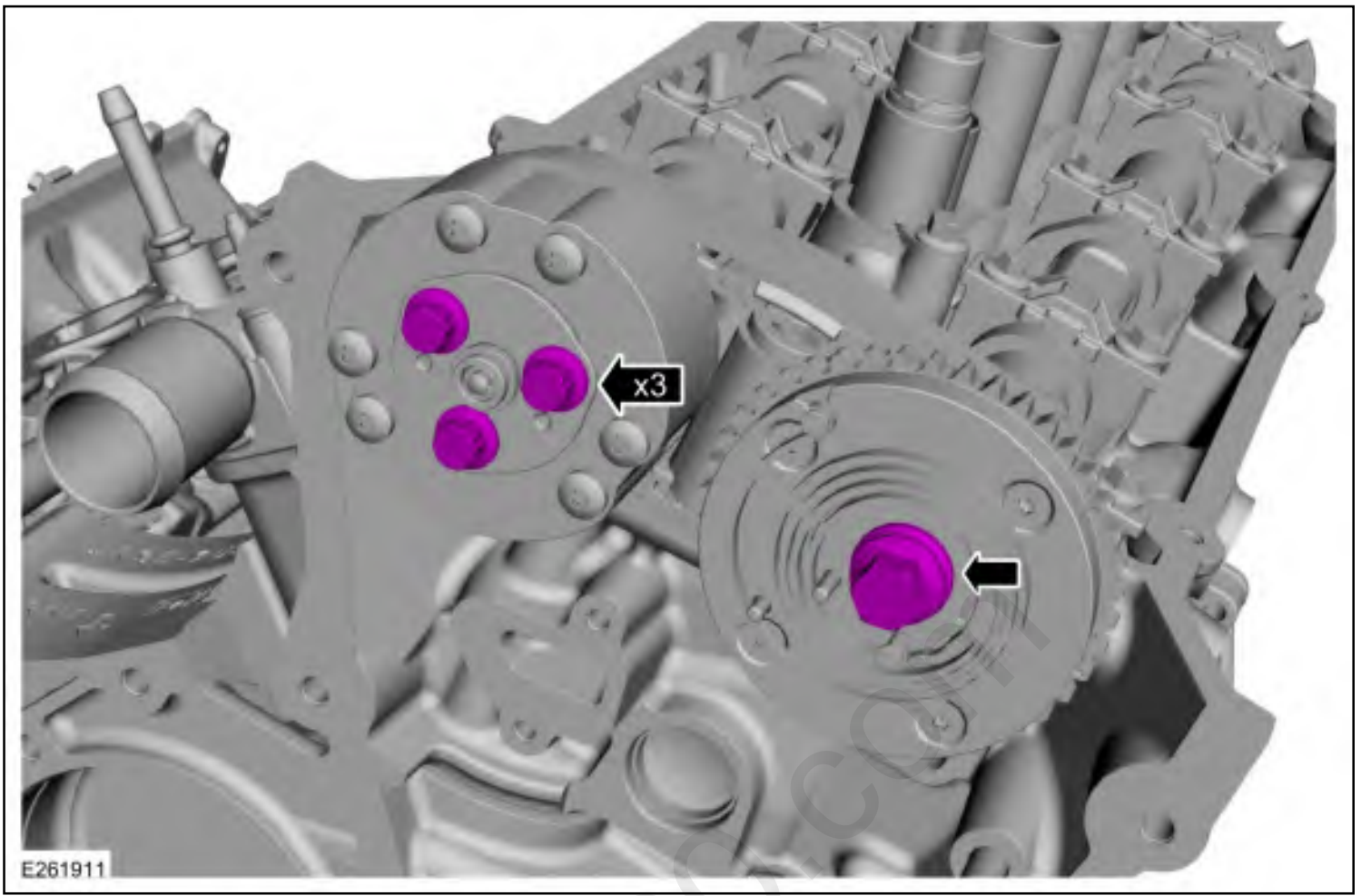
*Torque:*

Stage 1: 30 lb.ft (40 Nm)

Stage 2: Loosen: 360°

Stage 3: 20 lb.ft (27 Nm)

Stage 4: 150°



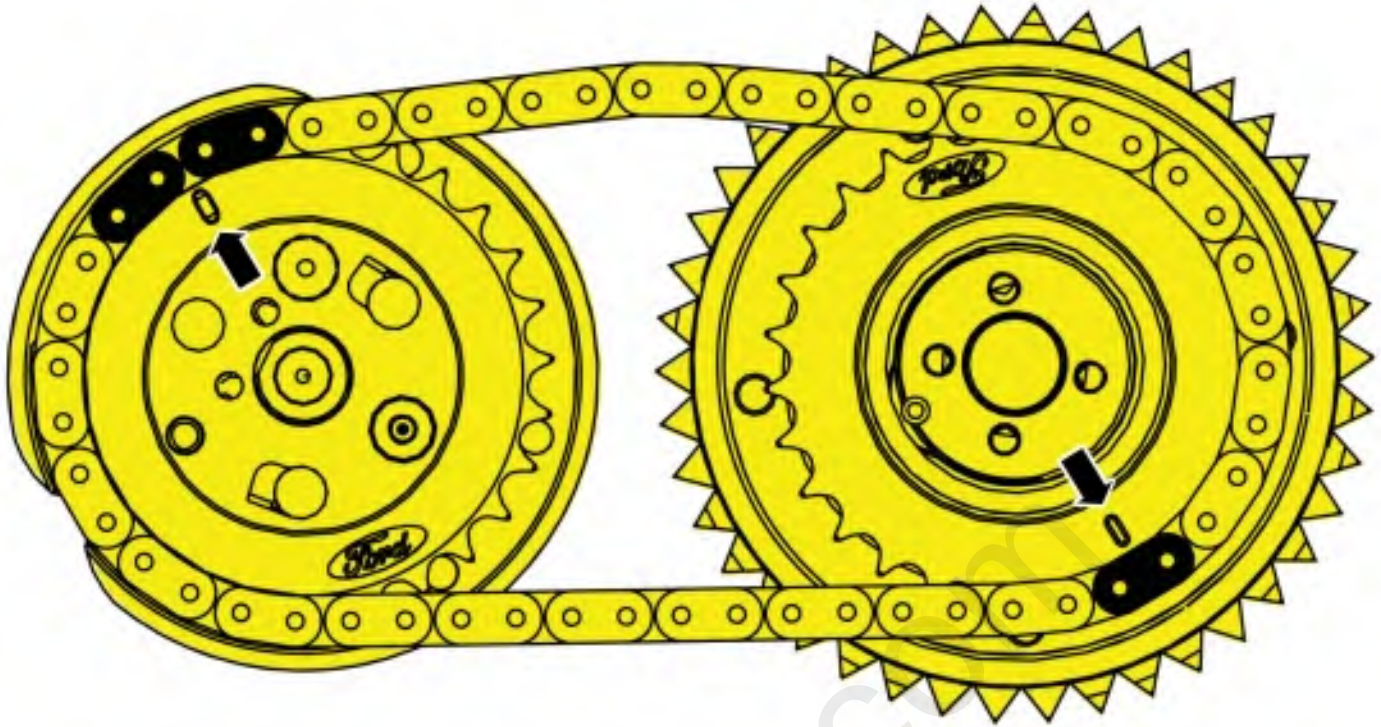
5. Install the LH timing chain.

Refer to: Timing Chain (303-01 Engine - 5.0L 32V Ti-VCT) .

### Right hand units

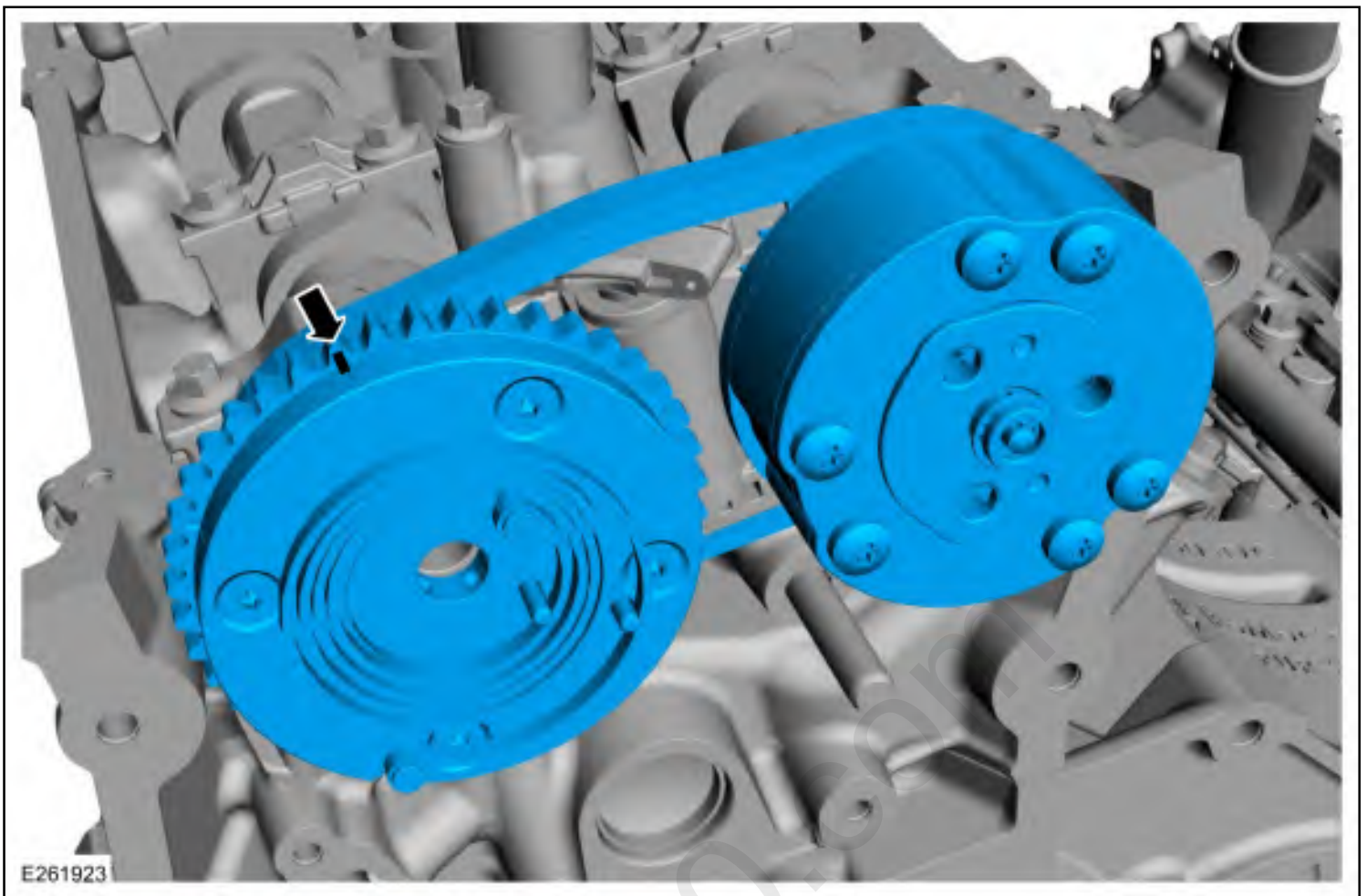
6. Position the secondary timing chain onto the VCT assemblies. Align the colored links on the secondary timing chain with the timing marks on the VCT assemblies as shown in the illustration.
- The timing mark on the intake VCT assembly should align between the 2 consecutive colored links.
  - The timing mark on the exhaust VCT assembly should align with the single colored link.





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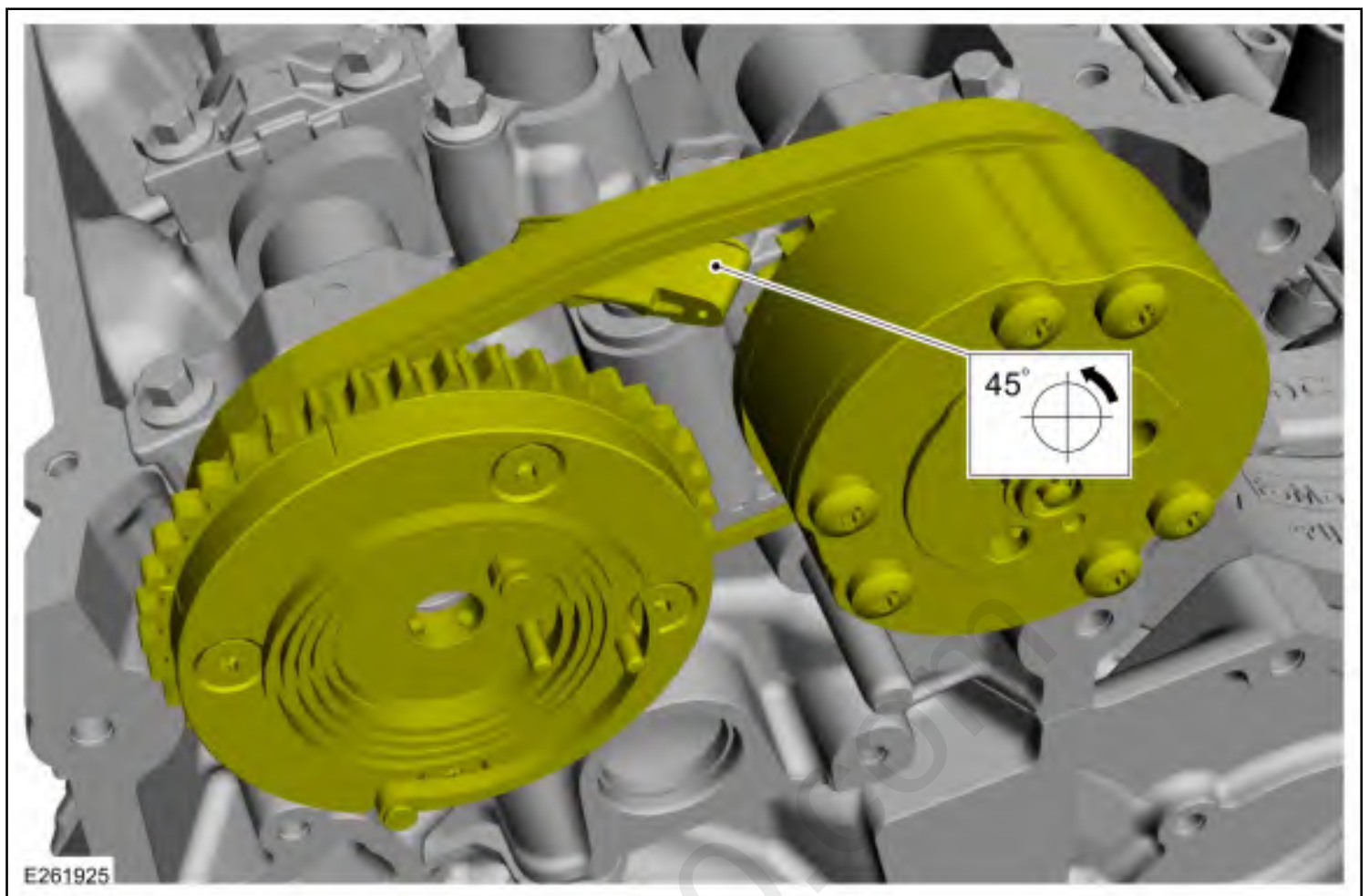
7. Install the VCT assemblies and the secondary timing chain onto the camshafts. The timing mark on the exhaust VCT assembly should be approximately in the 11 o'clock position.



8. **NOTE:** *It may be necessary to rotate the exhaust camshaft slightly (using a wrench on the flats of the camshaft) to seat the VCT assemblies onto the camshafts.*

Rotate the secondary timing chain tensioner counterclockwise 45 degrees so the ramped area is facing forward and fully seat the VCT assemblies onto the camshafts.

- If the secondary timing chain is not centered over the tensioner, reposition the VCT assemblies until they are fully seated on the camshafts.



9. **NOTE:** Use a wrench on the flats of the camshaft to hold the camshafts while tightening the VCT assembly bolts.

- Install the intake VCT assembly bolts.

*Torque:*

Stage 1: 133 lb.in (15 Nm)

Stage 2: 90°

- Install the exhaust VCT assembly bolt.

*Torque:*

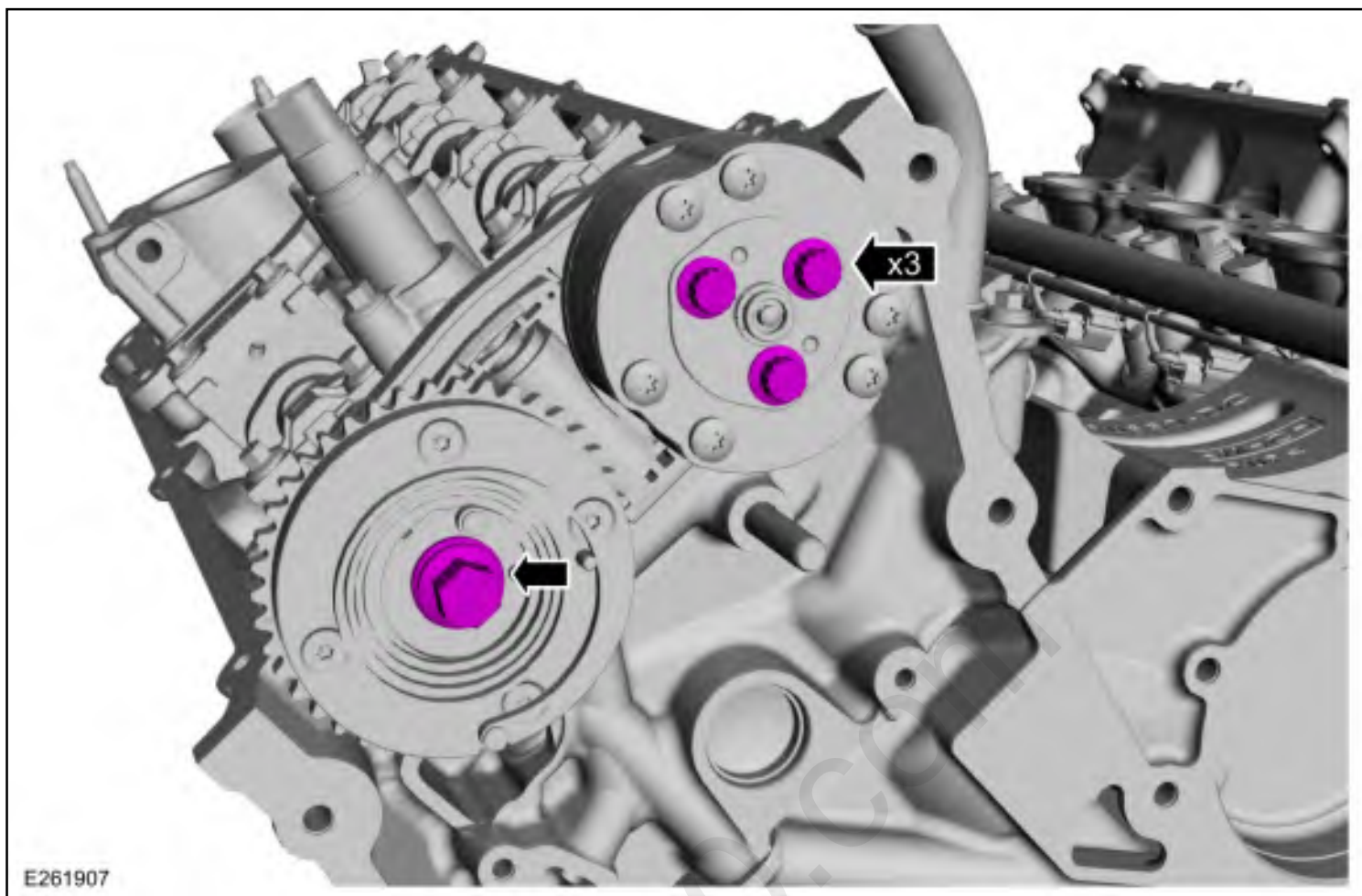
Stage 1: 30 lb.ft (40 Nm)

Stage 2: Loosen: 360°

Stage 3: 20 lb.ft (27 Nm)

Stage 4: 150°





10. Install the RH timing chain.

Refer to: Timing Chain (303-01 Engine - 5.0L 32V Ti-VCT) .

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